System and Method for Queue Management Using Queue Sets

ABSTRACT

The disclosure describes queue management based on queue sets. A queue set comprises a group of packets or packet references that are processed as a single entity or unit. For example, when a queue set reaches the head of a queue in which it is stored, the entire queue set including its packets or packet references is passed for scheduling as a single unit. A queue set provides the benefit of a single operation associated with enqueuing and a single operation associated with dequeuing. Since only one operation on a queue is required for the typical case of several packets in a queue set rather than for every packet, the rate of queue operations may be significantly reduced. A queue set has a target data unit size, for example, a roughly equal number of packet bytes represented by each queue set, regardless of the number of packets referenced by a queue set. This means that a scheduler of a queue manager, which is tasked with metering the number of packet bytes transmitted from each queue per time unit, is provided with a list of packets which represents a predictable quantity of packet bytes, and this predictability streamlines the scheduling task and significantly reduces the number of operations.